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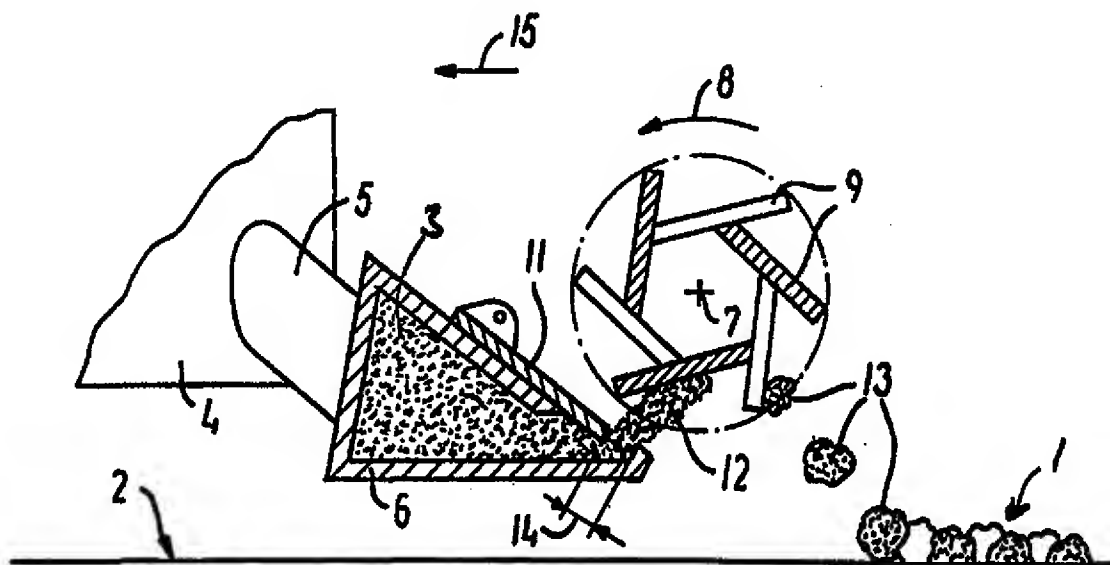
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In English translation (filed in Danish).

(54) Title: METHOD AND APPLICATION APPARATUS FOR ROAD MARKING



(57) Abstract

The invention concerns a method and an apparatus for the application of a marking (1) on a road surface (2), said apparatus comprising a vehicle which moves the apparatus over the surface (2). The marking material (3) is led from a supply container (4) to a distribution chamber (6) which, via a shutter (11), under slight pressure presses a band (12) of the marking material (3) out through an opening (14). The band of material (12) is led out towards a rotating axle (7) with blades (9). The material (3) in the band of material (12) is hereby divided into equal part elements (13) without the blades (9) touching the chamber (6) or any other parts of the apparatus. The influence of wear on the apparatus is hereby considerably reduced, even when use is made of material (3) containing abrasive additives. The part elements (13) are thrown to the rear and down against the surface (2) by the blades (9), where the material which is viscous at the moment of application stiffens in the form of elements (13) which constitute the finished marking (1).

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## METHOD AND APPLICATION APPARATUS FOR ROAD MARKING

### The known technique

5        The invention concerns a method for the application of marking on a road surface by use of a material which is viscous at the moment of application, and which from a supply chamber is led under pressure through a discharge opening, after which a number of rotating blades sweep-off the material which is thereafter thrown against the road surface in the formation  
10       of the marking, and an application apparatus for the execution of the method.

15       Road markings in the form of road stripes are known either as punctiform markings or as transverse beams. These forms of markings are expedient since they are not only very visible because they reflect light over a broad spectrum, but also provide good draining-off conditions for the water on the road. Moreover, driving over the markings will result in fairly strong vibrations as a warning to the driver of the vehicle.

20       In order to safeguard against skidding, it is known to add various friction-promoting additives to the material before it is led out and applied.

This additive can e.g. be sand, gravel, quartz grains or crushed glass.

25       However, the use of such additives leads to such great wear on parts of the application apparatus, especially the part around the discharge opening and the blades, that this results in a seriously limited lifetime and herewith frequent replacement of parts and repairs.

30       An apparatus which has been developed for use without additives is known from the description of DK 166378 B.

It appears from this publication that the individual blades sweep the discharge openings and the ledge on which the material is led out.

5 Naturally, this physical contact gives rise to a certain degree of wear, but this in itself is not so great that it limits the use of the apparatus.

10 However, if the material supplied contains additives in the form of hard materials, this will have such a subversive effect on both the discharge part and the blades that after a short period of use the apparatus is no longer functional.

#### The object of the invention

15 It is the object of the invention to overcome these disadvantages and drawbacks of the known methods, and this is achieved according to the invention by a method whereby the material is led out in a coherent material flow, and that the blades carry material from the free end of the material flow at a distance from the discharge opening.

20 In a simple manner, it is hereby achieved that the material can be carried by the blades completely without the material getting "pinched" between the supply parts and the blades.

25 The additive will thus neither damage nor give rise to wear or deformations on the mechanical parts of the apparatus, and therefore the method permits a trouble-free application of the material, even when it contains additives in large amounts or with large grain sizes.

30 As disclosed in claim 2, by configuring the application apparatus with blades which are so short that they move past the delivery openings at a relatively great distance, the apparatus will be able to effect the method

without any reduction in the speed of application or the quality of the marking.

5 As disclosed in claim 3, by providing the apparatus with several discharge openings each with their own shutter, the flow of material can be dimensioned so that the marking on the road has a sloping or convex cross-sectional form.

10 As disclosed in claim 4, by mounting the blades at mutual distances on the axle, the breadth of the blades will be limited and the amount of material swept off will therefore be correspondingly limited.

15 As disclosed in claim 5, by configuring the blades with full length across the discharge openings, the marking which results will be in the form of transverse beams.

#### The drawing

20 An example of a preferred embodiment for an application apparatus according to the invention will now be described with reference to the drawing, where

fig. 1 shows a section through the laying-out part of the apparatus, seen in the direction I-I in fig. 2, and where

25

fig. 2 shows the apparatus seen from above.

#### Description of an example embodiment

30 In fig. 1 is shown an example embodiment of the application apparatus during operation.

The apparatus is mounted on a vehicle which is not shown, but this vehicle requires only to be able to bear the necessary weight and move in the desired direction and at the desired speed over the road 2, as indicated by the arrow 15.

5

The supply chamber 6 is configured as a chamber with triangular cross-section, in which the marking material 3 stands under a light pressure so that it can be led out through an opening 14 which is regulated by a shutter 11.

10

The material will thus be led out in the form of a band 12 which hangs freely after the discharge opening 14. The blades 9, which are mounted on a rotating axle 7, will be fed into the course of the band 12 of material when the axle rotates.

15

The marking material 3 is supplied to the chamber 6 from a supply container 4 via a pipe 5. The consistency of the material is viscous, which is normally achieved by using a thermoplastic material which is held suitably heated.

20

A light pressure on the material can hereby give rise to the pressing out of the desired band of material 12.

25

Driven by a road-wheel or other means, the axle 7 with the blades 9 rotates counter-clockwise as shown by the arrow 8.

30

It can be observed that the space between the rotating blades 9 and the opening 14 from the supply chamber 6 can be several centimetres, corresponding to the distance between the circle of rotation for the blades, shown by the dot-dash line, and the discharge opening 14 in fig. 1.

Fig. 2 shows the apparatus seen from above.

The shutter 11 can be divided into more sections for adjusting the breadth of the marking 1 on the road 2.

5 The blades 9 can be produced in a given breadth, in the shown example corresponding to  $1/6$  of the breadth of the marking 1, and with spaces 10 between the blades in each row.

10 The blades can also be of a breadth corresponding to the breadth of the marking 1, and in such case the marking will be in the form of transverse beams instead of the round marking blobs 13 as shown.

15 The apparatus described can thus exercise the method, which means that there is no unnecessary wear between the mechanical parts even when the material contains hard additive materials, and since the apparatus can function at high speeds, the method ensures that the speed of application can be relatively high and that the blobs of material 13 are thrown against the surface of the road 2 at such a low velocity that there is no risk that they get deformed at the moment of impact.

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25

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## CLAIMS

1. Method for the application of marking on a road surface using a material which is viscous at the moment of application, and which from a supply chamber under pressure is led out through a discharge opening, after  
5 which a number of rotating blades sweep-off the material which is thereafter thrown against the road surface in the formation of the marking, **characterized** in that the material (3) is led out in a coherent material flow (12), and that the blades (9) carry material from the free end of the  
10 material flow (12) at a distance from the discharge opening (14).
2. Application apparatus for the execution of the method according to claim 1, **characterized** in that the blades (9) have a maximum extent in the radial direction which is less than the distance to the discharge opening  
15 (14), so that the blades (9) can rotate freely without touching the discharge opening (14) or other fixed parts of the supply chamber (6).
3. Application apparatus according to claim 2, **characterized** in that the supply chamber (6) is provided with several discharge openings  
20 (14) with shutters (11) for individual dosing of the material flow (12).
4. Application apparatus according to claim 2, **characterized** in that the blades (9) are mounted with mutual distances (10) between them for the formation of punctiform (13) markings (1).  
25
5. Application apparatus according to claim 2, **characterized** in that the blades (9) extend across the whole of the discharge opening (14) for the formation of beam-formed markings.
- 30



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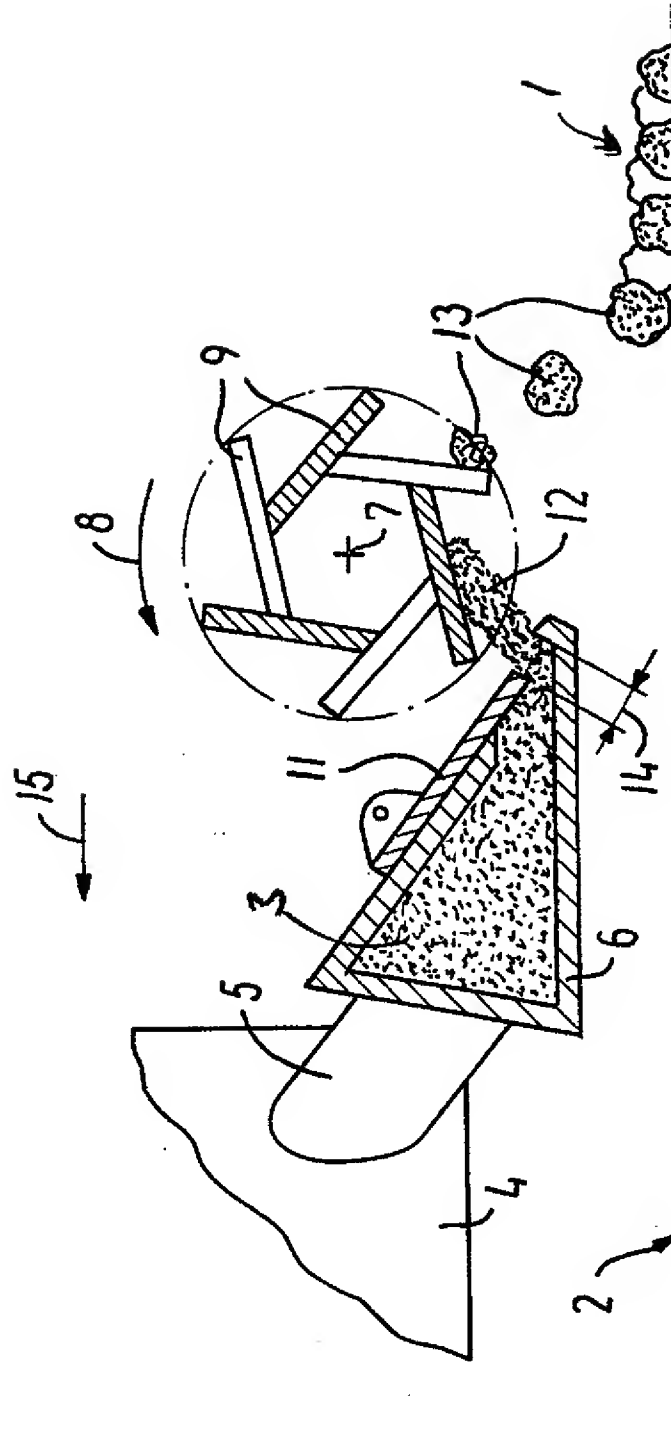


FIG. 1



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/DK 98/00446

## A. CLASSIFICATION OF SUBJECT MATTER

IPC6: E01C 23/20

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: E01C, E01F, B05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPI

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 8601748 A1 (WINTERSKOV, B.), 27 March 1986 (27.03.86), abstract, details 4,5 --	1-5
Y	US 4572703 A (J.G.K. MOLLER), 25 February 1986 (25.02.86), abstract, detail 22 --	1-5
Y	EP 0422346 A1 (WYSSBROD, F.), 17 April 1991 (17.04.91), figures 3,5 --	1-5
A	DE 3728250 A1 (GRUDE GMBH INGENIEURBÜRO), 9 March 1989 (09.03.89) -- -----	1-5

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# INTERNATIONAL SEARCH REPORT

Information on patent family members

01/12/98

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Information on patent family members

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